



# The Water Supply and Sanitation Sector in Ghana

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## **Abstract**

Public health and sustainable development cannot be significantly improved without dealing with the water and sanitation challenges. The dramatic environmental and social changes that happened in the developed world over the years were attributable to clean water supply and a hygienic toilet in or close to the home. As one of the most economically sound long-term strategic development investments, water supply and sanitation are central to global public health and sustainable development. This article reviews peer-reviewed publications on the water supply and sanitation sector in Ghana and makes suggestions and recommendations. The review revealed that Ghana's population data is dynamic, and confirms the reality of rural-urban migration in Ghana. Accelerated water supply coverage progress is witnessed in Ghana, which ensured the Millennium Development Goals (MDGs) target on water supply coverage was met. With 19% (5.1 million) open defecators in Ghana, 82% of whom are rural dwellers, one of Ghana's major sanitation challenges is open defecation. The review suggests that improved sanitation coverage is not only underachieved in Ghana, but also that water supply coverage far outstripped improved sanitation coverage. Massive investment in the sanitation subsector is therefore critical to achieve sustainable development and improved sanitation coverage progress. Multi-interventional implementation strategies are recommended to fast-track improved sanitation coverage progress in Ghana with greater emphasis on rural areas where nearly all practice open

defecation as the norm rather than the exception. For accelerated rural sanitation coverage progress, sharing results and initiatives of already successfully-implemented programmes that made significant impact in the lives of communities and scaling up through the Community Led Total Sanitation (CLTS) concept are further recommended. Rather than concentrating on waste collection and disposal, Ghana's environmental sanitation policy document be reviewed to focus on resources recovery maximization and pollutants minimization from waste. The author concludes that a dedicated support for community-driven interventions, strong political will for policy implementation, effective sanitation bye-laws enforcement, education and awareness creation on water and sanitation benefits are key for a sustainable water supply and sanitation sector improvement.

***Keywords: sanitation coverage, water supply coverage, policy, investment, Ghana.***

## **1. Introduction**

Water supply and sanitation are central to global public health and sustainable development. The health of people who lived in the northern hemisphere before the industrial revolution was not different from the developing world'. About 50% of deaths at the time occurred among children under five (5) years, a situation worse than what presently prevails in the world's poorest nations [1]. Life expectancy at birth in industrialized England was seventeen (17) years in 1940 [1] – a figure lower than the life expectancy at birth in any developing world today. One of the fundamental reasons for the high mortality rate was lack of clean water and sanitation. The developed world circumstances changed over the years, and the industrialized world now has such good water and sanitation access that they no longer worry about waterborne and sanitation-related diseases. Infant mortality therefore declined nearly to zero. The environmental and social changes that produced the dramatic decline in infectious diseases in the developed world over the years was attributable to clean water supply and a hygienic toilet in or close to the home [2]. Recognition of the relationship between contaminated water, poor sanitation and disease, and deliberate interventions to break the relationship accounted for the significant health improvement in the developed world.

Evidence that public health cannot be significantly improved without dealing with water and sanitation challenges is the interesting John Snow's story and the Broad Street pump in London [1]. Water supply

and sanitation provision is therefore one of the most economically sound long-term strategic development investments [2]. However, four times as many people globally (2.4 billion) lack improved sanitation than lack improved drinking water sources (600 million) [3] – a daunting sanitation challenge which may explain one reason for less attention payment to sanitation. Sanitation projects generally have high capital cost, and often thought to offer lower benefits compared to water supply projects [4]; [5]. Key sanitation components are liquid and solid waste, and stormwater, but all are currently poorly managed in Ghana. Policy implementation weakness is often one assigned reason for the poor management. It is however argued that the incompatibility of Ghana's local development policies with imported management approaches accounts for the little results [6].

## **2. Background information on Ghana**

Typical Ghanaian cities are characterized by huge uncollected waste, choked open drains with solid and liquid waste and the associated pungent smell emanating from them, and beaches turned into solid waste dump-sites. Ghana is situated on the West coast of Africa, and has a total land area of 238,537 km<sup>2</sup>, of which 8,520 km<sup>2</sup> is water [7]; [8]. Ghana shares borders with Ivory Coast to the West, Burkina Faso to the North, Togo to the East, and to the South are the Gulf of Guinea and the Atlantic Ocean (Figure 1). The mean annual rainfall is estimated at 2,030 mm in the South, 1,000 mm in the North, and the annual temperature ranges between 21°C and

32°C [7]. Ghana’s 2010 population was roughly 24.7 million, of which 51.2% was female and 48.8% was male – a sex ratio of 95 males per 100 females [9]. The 2010 population and housing census revealed that average annual population growth rate was 2.5% [9]. Ghana’s selected demographic characteristics include 55.3% adult population (18+ years), and a dependent population of 44.7% (15 – 65 years) [9].



Source: [7]

Figure 1: Map of Ghana showing geographic boundaries and main cities.

### 3. Water supply sector levels in Ghana

Lack of piped water services in households means that people are obliged to use limited, unreliable, and poor water supplies at a higher cost [10]. Ghana’s water supply service levels are low, uneven, and vary from rural to urban areas, leading to high incidence of water- and sanitation-related diseases. Water portability is however a “non-issue” for communities without access to water, as their water supply needs must be met [11]. Households without access to piped water, borehole water, or water from protected wells tend to rely on less reliable and unhygienic sources, including surface water (such as rivers, streams, dams, canals, and ponds), sachet or bottled

water, and rainwater [9] – water sources used before Ghana’s first water supply system was developed [12]. Table 1 shows Ghana’s improved water supply coverage and population distribution for 1990, 2000, 2010, and 2015.

Table1: Ghana’s improved water supply and Coverage & population distribution (1990, 2000, 2010, 2015)

Year	Population			Water supply coverage (%)		
	Total (× 1000)	% urban	% rural	Total	Urban	Rural
1990	14,968	36	64	54	84	37
2000	19,529	44	56	71	88	58
2010	24,392	51	49	86	91	80
2015	26,984	54	46	89	93	84

Source: [13]; [14]

Data on Ghana’s water supply coverage and population distribution show a consistent urban population rise, with a corresponding rural population decline over the period (Table 1) – a confirmation of rural-urban migration reality [13]; [14]. Rural and urban populations were almost equal in 2015, compared to 1990 when rural population was about double that of urban. Whereas there was 80% (or 12 million) rise in population over the 25-year period, a significant 15.9 million additional people were served with improved water supply over the same period. Improved water supply coverage in Ghana therefore far outstripped the population rise over the period 1990 – 2015. The finding confirms accelerated water supply coverage success in Ghana, demonstrated by the impressive 84% coverage progress with the outcome that the MDG on water

supply coverage was met. However, it is argued the dominant view and concentration on improved water coverage at the expense of water affordability, quality, distribution, and reliability challenges is misleading [15].

The latest WHO/UNICEF report represents the first global population assessment of “safely managed” drinking water and sanitation services, focusing on global inequalities minimization, ending open defecation, and achieving universal access to water, sanitation, and hygiene [16] – a complete departure from similar previous reports. Safely managed drinking water and sanitation services in the report mean drinking water free from contaminants, available at home for use always, and sanitation facilities that safely treat and dispose of excreta [16]. Aside the water supply and sanitation ladders applied under the MDGs, the SDGs introduced hygiene as the third ladder. However, this review paper relies largely on earlier versions of the report – partly for consistency, and partly due to the current scanty and insufficient data on the new assessment methodology and indicators, making a critical review impossible.

#### 4. Sanitation sector service levels in Ghana

Though Ghana’s population rose by about 12 million between 1990 and 2015, only 3 million additional people were served with improved sanitation over the period. The results therefore suggest that improved sanitation coverage was not only an underachievement in Ghana, but also that water supply coverage progress far outstripped improved

sanitation coverage. Ghana made only one percent (1%) progress in improved sanitation provision in the last five years (2010 – 2015) under review. There was therefore either no or limited progress across regions in the sanitation subsector. Open defecation was practised by about 5.1 million (19%) Ghanaians in 2015, of which 4.2 million (or 82%) were rural dwellers [13]; [14].

To accelerate rural sanitation coverage, sharing of already successfully-implemented programmes’ results that made a difference in the lives of communities through the Community Led Total Sanitation (CLTS) concept is recommended. Other works show comparable results of open defecation proportion in Ghana. Though open defecation is primarily due to lack of access to sanitation facilities, rural coastal Odisha dwellers had other justifications for openly defecating despite owning latrines [17]: the facilities were poorly constructed, had neither doors nor roofs, and the pits were too small. The author further recommends multi-interventional implementation strategies to fast-track sanitation coverage progress in Ghana with greater focus on rural areas where nearly all practice open defecation, not as the exception but the norm.

Table 2: Ghana’s improved sanitation coverage & population distribution (1990, 2000, 2010 and 2015)

Year	Population			Sanitation coverage (%)		
	Total (× 1000)	% urban	% rural	Total	Urban	Rural
1990	14,968	36	64	7	11	4
2000	19,529	44	56	9	15	5
2010	24,392	51	49	14	19	8

2015	26,984	54	46	15	20	9
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Source: [13]; [14]

The 2006 Ghana Statistical Service Multiple Indicator Cluster Survey report revealed that open defecation was prevalent in all ten regions, but most widespread in the Upper-East region where 82% of the population was without any form of sanitation facility [18]. Sabon Zongo’s residents of Accra (Ghana) however had their own unique open defecation practice [19]: unable to pay and use the community’s available sanitation facilities, residents packaged liquid and solid waste into plastic bags and dumped them indiscriminately within the community. A desk study found that open defecation took a toll on individuals and economies – about 2.5 days per year were spent by each person who practiced open defecation to find a private and appropriate place to defecate, which led to huge economic losses [20].

Open defecation is therefore one of Ghana’s key sanitation challenges. The “sanitation deficit”, partly accountable for open defecation, is due to non-equivalent benchmark application to water supply and sanitation – household-level sanitation access compared to community-level water supply access [21]. The huge disparity in coverage progress between sanitation and water supply coverage figures is largely due to like-with-unlike comparison. About 85% of Ghanaians lacked access to improved sanitation [14], making the challenge of meeting the SDGs for sanitation increasingly difficult, haven missed the 2015 MDGs sanitation target. It is argued

that the current narrow definition of improved sanitation partly accounts for the low sanitation coverage figures recorded across developing countries [22] – a considerable number of developing countries’ sanitation facilities are shared, which are excluded from the improved sanitation category.

#### 4.1 Waste Management

Waste is a potential valuable resource that can be tapped through waste sorting, reuse, and recycling, and generated from production and consumption activities overtime. Ghana’s waste management and implementation strategy is presently weak, as about 76% of households rely on improper waste collection and disposal methods, and only under 5% rely on house-to-house (HH) collection [23]. Key sanitation components are liquid, solid, and stormwater management.

##### 4.1.1 Liquid waste management

Urban wastewater management in Ghana is the responsibility of local municipal authorities (such as Accra Metropolitan Assembly (AMA), Kumasi Metropolitan Assembly (KMA)). Rapid urbanization brought with it huge new demand for infrastructure services – water, sanitation, waste management, and electricity. The minimum criteria for liquid and solid waste disposal in Ghana are a waste pit and uncontrolled pit respectively [24]. Most wastewater generated in Ghana is domestic effluent and urban run-off while the contribution from the industry is insignificant due to low industrial development [25]. However, recent evidence suggests substantial industrial development in Ghana, which implies

increased industrial wastewater generation. Some sanitation facilities in Ghana partially treat waste before disposal or further treatment and can be either on-site or off-site. On-site methods include dry methods (such as pit latrines, VIP, KVIP, composting), water-saving methods (pour-flush latrines and aqua privy), and high-water use systems which are emptied (flush toilets with septic tanks and soakage pit). Off-site methods are bucket latrines, pour-flush toilets with vault, tanker removal and conventional sewerage systems.

Ghana has very few sewerage systems, and most are found in institutions such as government ministries, hospitals, and academic institutions rather than settlements. In terms of practices, about 38% of Ghana's population throw liquid waste (mainly greywater) on the streets or outside the house, 21% throw it directly in the gutters, 35% in the compound, 10% in other places, while only 5% dispose them through sewerage networks connected to treatment plants [25]. Madina (Ghana) faecal sludge management assessment confirmed that 21% of greywater is discharged into storm drains [26]. A study conducted in Accra (Ghana) also estimated that about 12% of the population throw them either on the streets or outside the house, 53% directly into gutters, and 20% in the compound [25].

Wastewater treatment and disposal in Ghana is either on-site or off-site, but coverage is currently very low. Less than 15% of septage generated in Accra and Kumasi is effectively treated [27]; [7]. Most urban

dwellers rely on septic tanks for faecal sludge collection and disposal while greywater is mostly directed to open drains [26]. Despite low wastewater treatment coverage, the distribution of the few available plants is uneven – out of the 42 plants in Ghana, more than half are in Accra and most of them (especially the public ones with larger capacity), are either not functional or dysfunctional [25]. Sludge treatment plants are also located in Dompoase and Kaase – Dompoase handles most of Kumasi's treated waste [28]. Test on Dompoase plant effluent however shows that untreated waste is discharged by the plant downstream. The major treatment methods are waste stabilization ponds (WSPs), trickling filters and activated sludge. Found at Asafo (Kumasi), Tema Community 3, Legon Staff Village, and Teshie-Nungua, most WSP systems in Ghana have two facultative ponds [25]. Trickling filters are widely used in Ghana – at Burma Camp (Accra), Kwame Nkrumah University of Science and Technology (KNUST), and Nsawam Prisons [29]. The activated sludge process is however mainly used by big hotels in Ghana – La Palm, Labadi, Golden Tulip, and 37 Military Hospital (all in Accra).

#### *4.1.2 Solid waste management*

Solid waste is any material which the householder discards, intends (or required) to discard, except gaseous and liquid waste [30]. Poor solid waste management (SWM) is one of the major environmental and public health concerns, particularly in developing countries (Ghana inclusive). Rapid urbanization (Sections 3 and 4) in



these countries means that massive quantities of solid waste are generated daily. Daily waste generated in developing countries is between 300 and 600 grammes per person per day [30], figures likely to rise due to urbanization and increased consumerism witnessed in our modern cities. Accra and Kumasi generate an estimated 4,200 tonnes of solid waste daily with a collection rate of about 70% [6]. One challenge is however that the growth in solid waste generation far outmatches suitable SWM practices and infrastructure provision.

Plastics are detrimental solid waste not only to the environment, but also to humans and animals. The frequent floods experienced recently in Ghana are partly due to choked drains with plastics. Though some African countries enacted laws banning plastics use, implementation was unsuccessful – a demonstration of Africa's weak policy implementation. The plastic ban policy of all categories in Kenya is the most recent. The success of the implementation in Kenya and whether Ghana will follow suit are however unclear. Ghana produces a significant quantity of plastic waste annually, yet an insignificant proportion is recycled – a wasted valuable resource with huge opportunities for affordable and sustainable building materials production, among others. The situation presents a missed opportunity for resource recovery with the accrued economic benefits. Recent research however suggests that Ghana is making substantial foreign exchange through recycled plastics exportation to neighbouring countries such as Nigeria, Ivory Coast,

and Togo [6]. About 4.5 million metric tonnes of solid waste are generated annually by an estimated 23 million Ghanaians [31], most of which is either uncollected or undisposed. Under half of urban solid waste generated in developing countries is however collected by municipalities and private sector with limited or no recycling [32]. Zoomlion, a waste management company, is currently widely operating in Ghana. The SWM services evolution in Ghana is captured as Table 3.

Two solid waste collection service systems are in Ghana – door-to-door or house-to-house (HH), and communal container collection (CCC) [33]; [6]. Pre-collection however exists in areas with poor accessibility using manual and motorized tricycle introduced by Zoomlion [31]. The HH waste collection targets low-density middle- and high-income well-planned urban communities, and some public institutions. Registration (by landlords, kiosk owners, businesses or office building owners) is first done with the contractor for a fee depending on the customer's income level. The municipality or contractor provides a free refuse bin, and solid waste collection commences for a fee of between Gh¢2 and Gh¢15 (averagely USD3) per month in Kumasi (Ghana), and USD4 average in Accra (Ghana) [6]. The challenges of the HH collection system are high monthly fees and non-regular refuse collection. The CCC collection mode takes two forms – pay-as-you-dump, and free dumping [6]. The pay-as-you-dump is common in low-income densely-populated peri-urban communities, where households discharge

waste into skips located at vantage points for pick-up. The free dumping is designed for public places such as markets, public hospitals, among others

Table 3: SWM services evolution in Ghana

Year	Key event
1898	Accra City Council established under the Town Council Ordinance of 1894 & charged with sanitation management
1925	Systematic waste collection & disposal services commenced – public dustbins emptied by pushcarts
1929	Incinerators introduced
1970	Incinerators broke down due to increasing quantities of generated waste
1990	Policy shift towards private sector-led SWM initiated
1999	Urban Environmental Sanitation Project (UESP) established under World Bank & Ghana Government initiative; Decentralization of local services delivery to local governments began; Legal framework and policy guidelines on SWM in Ghana (Act 462) & Environmental Sanitation Policy (ESP) developed
2010	ESP reviewed, prompted by flaws in the policy after 10 years implementation

Source: [6]

There is a general negative public attitude to SWM in Ghana, particularly in peri-urban areas. There are recently only two landfills in Ghana located in Kumasi and Tamale, while two are under construction in Sekondi-Takoradi and Tema [31]. Other methods such as incineration, anaerobic digestion, and waste conversion to energy are at the exploratory stages. Faecal management public perception study in Madina (Ghana) found that faecal sludge management was characterized by weak sanitation bye-laws enforcement and regulatory frameworks, failure to educate people on household

latrines benefits, and lack of sensitization and awareness creation on good sanitation practices [26]. Improved legal and regulatory frameworks with strict contract enforcement and monitoring are required through sanitation courts formation in communities.

The 2010 Environmental Sanitation Policy is therefore expected to adequately deal with the causes of poor environmental sanitation, and close gaps in sanitation delivery in Ghana [27]. The policy however has its caveats: whereas developed countries focus on environmental pollution minimization and resource recovery maximization, the developing ones (Ghana inclusive) continue to do business-as-usual [6] – waste collection and disposal prioritization at the expense of waste and pollutants minimization through reuse, recycling, and recovery. Concrete targets on various aspects of waste management are also not set out in the policy. The flaws inherent in the ESP after ten years of implementation prompted a review in 2010 (Table 3). The lack of adequate waste audit information in developing countries and the adoption of foreign SWM policies partly account for the SWM failures in developing countries [6]. It is therefore recommended that a more robust environmental policy with specific targets and timelines, revolving around the principles of waste reduction, reuse, recycling and recovery be developed.

Deficient 2010 Environmental Sanitation Policy notwithstanding, poor attitudinal challenges make it increasingly difficult for local authorities to maintain



good sanitation in communities despite several interventions. Waste dumping in gutters and drains near houses and unoccupied areas are typical negative attitudes and practices that worsen waste management in Ghana [34]. Despite the outlined challenges, Ghana met the MDG target on water supply coverage progress, but failed to meet the MDG on basic sanitation coverage progress. For an efficient and sustainable SWM in Ghana, a combination of health promotion and community sensitization with the overemphasized infrastructure improvement, and effective integration of locally-derived strategies with the imported solutions is required.

#### *4.1.3 Stormwater management*

When there were minimal development decades ago, stormwater drained into the natural water systems, streams, and wetlands, while some infiltrated through the soil to the groundwater table. Decades of extensive development today, triggered by urbanization means increased concrete and asphalt surfaces – disallowing groundwater infiltration into soil. A significant land space is occupied by infrastructure, some built directly on waterways preventing water from finding its natural course – the outcome is destructive floods recorded annually across major cities such as Accra and Kumasi. The destructive nature of floods affects transportation, power and telecommunication networks, and damage to buildings, among others [35]. Run-off increases flooding, but reduces groundwater infiltration and shallow interflow [36]. It is however argued that the

benefits of living closer to potential employment centres and urban services outweigh the demerits of floods, usually perceived as seasonal and natural events [35].

The current dangerous practice of wetland reclamation in Ghana's major cities for commercial and residential building construction is a growing threat to the loss of natural drainage systems. Stormwater transports with it waste and pollutants, which pose public health and environmental quality concerns [37]. Most residents living along river banks, for instance, have no sanitation facilities and so resort to open defecation (especially in the rainy season). The practice leads to waste and pollutants (such as excreta, black polythene, sanitary pads, among others) accumulation along streams and wetlands downstream. A reversal of the current practice is necessary if a catastrophic disaster of unimaginable proportion in the future is to be avoided.

However, stormwater management is no longer the sole concern of major fast-growing cities of the world [36]. The Accra Metropolitan Assembly (KMA) developed a stormwater management model which used different population scenarios up to 2030 to test different stormwater management options [38]. The model found that flood through run-off reduction by up to 30%, while large-scale stormwater and wastewater tanks showed significant imported water reduction by 29% [38]. Stormwater harvesting for useful purposes also showed reduction in the

quantity of run-off, thus reducing flood risk. Besides engineered infrastructure requirements for drainage of urban run-off, behavioural changes are effective complementary measures, focusing on preventive actions to mitigate floods, pollution, and deterioration of environmental health conditions [35]. Stormwater management solutions in Ghana are often of the ad-hoc nature – rather than developing long-term solutions, and action seen to be taken only after a flood event to enable communities recover from the flood impact.

### 5. Sanitation sector investment in Ghana

The colonial Governor (Guggisberg) of Gold Coast (1919 – 1927) emphasized the critical role of investment when he argued that:

*“Unless the Gold Coast spends every penny it can justifiably afford on extending its present lamentably inadequate facilities for transport, education and sanitation, its progress must and will be so hopelessly retarded as to give real cause for discontent, unrest and failure”* [40].

Ghana relies hugely on loans and grants from bilateral and multinational donors for financing development projects in the water supply and sanitation sector [41]. Low household sanitation investment in Ghana is evident from the extremely low improved sanitation coverage progress [42]. Government of Ghana’s first loan facility totalled USD 3.5 million was approved in 1969 to finance the implementation of “Accra/Tema water supply and

sewerage project,” which was followed by an extended loan facility of USD 10.4 million in 1974 [12]. Out of the total investment in the sector between 1990 and 1999, 95% of it was international funding assistance, and actual funding assistance to Ghana from 1990 – 2003 was USD500 million for water and sanitation [43]. About USD52 million annually is spent on sanitation in Ghana, and only 3.5% is provided by Government of Ghana [44]. The rest is provided by foreign donors, mainly the World Bank, UNICEF, the European Union, and the Danish International Development Agency (DANIDA). A MDG needs assessment for Ghana quantified infrastructure, human resource, and financial needs to achieve the MDGs found that USD80 per capita in 2006 was required, which rose to USD124 in 2015, compared with USD40 per capita spent in 2002 [5].

CWSA projected that USD756 million was required over a 11-year implementation period (2005 – 2015) to increase coverage to 85% in Ghana’s rural communities and small towns, creating a funding gap of USD233 million [41]. To fill this gap, Ghana’s funding ought to be increased by 40%, distributed among beneficiary communities, District Assemblies (DAs), and government at 5%, 5% and 30% respectively. Cost-benefit analysis for sanitation and water investment carried out in 12 countries (Ghana, Nigeria, Ethiopia, Uganda, South Africa, Tanzania, Zambia, Bangladesh, China, India, Sri Lanka, and Cambodia) showed that all the sanitation investments in these countries were in the range 5 – 23 [45], which meant all the sanitation investments in these

countries were economically beneficial. The sanitation (or water) benefit-cost ratio is the quantified economic benefits to society (in USD) achieved by investing every USD1 on sanitation or water.

As illustrated in Table 4, priority is not usually given to sanitation in development projects in developing countries. Though the provided data currency is debatable, a comparison of the total investment in water supply and sanitation makes the sanitation subsector neglect undebatable. The data shows that out of USD 16.13 billion invested in the water supply and sanitation sector across the three regions over the 1990 – 2000 period, under 25% of total investment went to the sanitation subsector and the rest (over 75%) was committed to the water supply subsector. The picture looked worse for the African region, as only 12% of total investment was allocated to sanitation – an amount woefully inadequate given the enormity of the sanitation challenge in the developing world. Though investment in sanitation is found to be economically beneficial, poor investment in that subsector is contributory factor to the sanitation challenges.

Table 4: Annual investment comparison in water supply and sanitation in Africa, Asia, and Latin America & The Caribbean (1990 – 2000)

	Africa	Asia	LA & C	TOTAL
USD billion				
Water supply	4.091	6.063	2.410	12.564
Sanitation	0.542	1.104	1.503	3.564
TOTAL	4.633	7.167	3.913	16.128

Source: [46]

Shifting a significant proportion of the cost burden of public utilities to the rural poor implies price rises, and its associated effect on consumers cannot be overemphasized [47]: the cost of three buckets of water from a vendor can cost as much as 20% of the average daily income of a poor household, which translates to over 10 times the average proportion paid in rich areas served with piped water; where piped systems do exist, the poor face considerable difficulties in raising the requisite capital to meet the initial cost of connection. Proponents often argue that privatization provides for the delivery of the same goods and services at a lower cost. Studies in Tamale Metropolis (Ghana) however suggest the contrary [48]: while the assembly offers USD0.03 per use of sanitation facilities, some private managers charge as high as USD0.06. Private water tankers also sell a barrel (20 gallons) of water at USD1.30, three-fold GWCL’s USD0.43 rate. The debate on key services (water supply and sanitation inclusive) privatization in developing countries, mostly in return for grants, loans, and aid therefore continues unabated. Central to the debate, however, is whether it is justifiable to treat fundamental human rights resources inevitable for life as commodities [49].

## 6. Conclusion and recommendations

The dramatic environmental and social changes that happened in the developed world over the years were attributable to clean water supply and a hygienic toilet in or close to the home. Water supply and sanitation are therefore central to global public health

and sustainable development. A snapshot of Ghana's water supply and sanitation situation shows that Ghana's population data is dynamic, and confirms the reality of rural-urban migration. The results show accelerated water supply coverage progress in Ghana, demonstrated by the impressive 84% coverage recorded over the 25-year period (1990 – 2015) which ensured Ghana met the MDG target on water supply coverage progress. With 19% (or 5.1 million) open defecators in Ghana (82% of whom are rural dwellers), one of Ghana's major sanitation challenges is open defecation. Scaling up the Community Led Total Sanitation (CLTS) concept and sharing of results and initiatives of already successfully implemented programmes that make a difference in the lives of communities are recommended for accelerated rural sanitation coverage.

The review suggests that improved sanitation coverage is not only underachieved in Ghana, but also that water supply coverage far outstripped improved sanitation coverage. Multi-interventional implementation strategies are recommended to fast-track improved sanitation coverage progress in Ghana with greater emphasis on rural areas where the practise of open defecation is the norm rather than the exception. Ghana's environmental sanitation policy document focus is currently on waste collection and disposal, rather than prioritizing resource recovery maximization and environmental pollutants minimization. It is therefore recommended that a more robust environmental sanitation policy be developed grounded on the

principle of waste and pollutants minimization through reuse, recycling, and resource recovery maximization. Though evidence of political will to formulate policies exists in Ghana, the political will to support policy implementation is lacking. Sustainable water supply and sanitation provision therefore requires political will for policy implementation, strong support for community-driven interventions, bye-laws enforcement, education on household latrines benefits, and awareness creation on good sanitation practices and attitudes.

## 7. Study limitations

Some of the used data, particularly related to Ghana, might be limited in terms of currency due to difficulties in getting reliable and credible literature on some subjects.

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### Author Profile



**Roland S. Kabange** is born in Navrongo (Ghana) to uneducated parents. Roland holds a PhD in Environmental Engineering (sanitation option) from The University of Leeds, West Yorkshire (The United Kingdom), MSc (Irrigation Engineering) and BSc. (Civil Engineering) both from Russian Peoples’ Friendship University, Moscow (Russia). He also participated in a certificated Ecological Sanitation Course in Sweden, South Africa, and Ghana

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